

REMARKS

In the present application, claims 1-25 are pending. Claims 1-12 were rejected. Claims 13-25 were allowed. As a result of this response, claims 1-25 are believed to be in condition for allowance.

Rejected Claims

The Office Action Summary of the present Office Action makes no mention of the status of pending claims 17 and 18. Both of claims 17 and 18 were indicated to be allowable in the previous Office Action of November 16, 2005 and have not been amended or canceled in the interim. A brief telephone conversation with the Examiner confirmed that both claims 17 and 18 are still pending, are still allowable, and were omitted as the result of an inadvertent oversight.

Claim Rejections – 35 USC § 101

The Examiner rejected claims 1-12 as reciting non-statutory subject matter. Specifically, the Examiner asserted that “Amended claims 1-12 are still directed towards a signal constellation which is simply a data signal. Note this data signal merely consists of “1” and “0” to represent the coded signal. It does not fall under the category of [f] a method, apparatus, product, or composition of matter.” After reciting a portion of MPEP §2106 IV.B.1.(b), the Examiner further asserted that “The signal is functionally equivalent to the compact disc in that it is nothing more than a carrier for nonfunctional descriptive material (1’s and 0’s). The nonfunctional material, or the signal for that fact, cannot alone provide the practical application for the manufacture. Without a communications device, the signal is nonfunctional, it produces or manufactures nothing.”

Claim 1 recites:

A multi-level space-time signal constellation stored by a computer readable storage media, comprising:

a first level of a signal constellation defining at least one point

a second level of the signal constellation defining a plurality of points, wherein a distance between a point defined by the second level and a nearest point defined by the first level is a maximized minimum distance between conditional distributions, and

the signal constellation defines C points and an average power that is greater than or equal to a sum of the squares of the absolute value of each point divided by the number C.

In the “Response to Amendments/Arguments” section, the Examiner asserted that “Applicant states that the signal constellation of claim 1 may be viewed as a data structure stored on a computer readable medium, and as such, is statutory subject matter. However, after reviewing the MPEP, it is the understanding of the examiner that the signal constellation as claimed is still non-statutory subject matter. MPEP 2106 IV.B.1 states that ‘a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure’s functionality to be realized, and is thus statutory’. The signal constellation as recited in claim 1 does not define any ‘functional relationships’ which would allow the recognition of the functionality of the data structure (signal constellation) to be realized when encoded on a computer readable medium. The claim simply recites an arrangement of data points and is silent to ‘structural and functional relationships’ which would allow the recognition of the functionality of the arrangement of data points. Thus, the signal constellation of claim 1 is deemed nonfunctional descriptive material which is non-statutory subject matter.”

Applicants respectfully disagree with the Examiner’s interpretation of the plain language of MPE P 2106 IV.B.1. Specifically, while the passage recited by the Examiner actually supports the patentability of claim 1, a full reading of the entire passage to which the Examiner refers makes even more clear the statutory nature of the subject matter of claim 1. MPE P 2106 IV.B.1(a) states:

Data structures not claimed as embodied in computer-readable media are descriptive material *per se* and are not statutory because they are not capable of causing functional change in the computer. See, e.g., *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure *per se* held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized. **In contrast, a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships** between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, **and is thus statutory.** (emphasis added).

When read in its entirety the following is clear. If a data structure is not claimed as embodied in a computer-readable medium, the data structure is descriptive material *per se* and not statutory. Put simply, the analysis proceeds as follows: If a data structure is claimed **and** it is not claimed to be embodied on a computer-readable medium, **then** it is descriptive and non-statutory. Why? Because such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized.

This, by itself, is not dispositive in the present instance as claim 1 fails the predicate. Namely, claim 1 recites a data structure (the signal constellation) and it **IS** claimed to be embodied on a computer-readable medium. Fortunately, the rest of the passage pertains explicitly to the recitation of claim 1 beginning with the clear language "In contrast". The contrasting analysis proceeds as follows: If a data structure is claimed **and IS** claimed to be encoded on a computer readable medium, **then** it is statutory. Why? Because the recitation of a computer-readable medium encoded with a data structure **defines** structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized.

The Examiner seems to interpret the above to require that a claim that recites a data structure encoded on a computer-readable medium to *further* define functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized. However, the MPEP is clear on this point. It is the mere claiming of the data structure as embodied on a

computer-readable medium, that **defines** the functional interrelationships required to render the claim statutory.

Applicants therefore respectfully submit that the Examiner is in error when asserting that “The signal constellation as recited in claim 1 does not define any ‘functional relationships’ which would allow the recognition of the functionality of the data structure (signal constellation) to be realized when encoded on a computer readable medium.” In light of the discussion above, it is evident that, in fact, by claiming a signal constellation stored by a computer readable storage media, claim 1 defines the necessary functional relationships required for statutory purposes as defined in the MPEP.

As before, Applicants again respectfully disagree with Examiner’s characterization of the claimed signal constellation. Specifically, the recited signal constellation is not, as the Examiner asserts, a data signal, it does not “merely consist of ‘1’ and ‘0’”, and it is not Nonfunctional Descriptive Material. With reference once again to MPEP §2106 IV.B.1, it is stated that “‘functional descriptive material’ consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of “data structure” is “a physical or logical relationship among data elements, designed to support specific data manipulation functions.”...). Further, at MPEP §2106 IV.B.1, it is clearly stated that “a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure’s functionality to be realized, and is thus statutory”.

Applicants respectfully submit that the signal constellation of claim 1 may be viewed as a data structure (as the Examiner allows) stored on a computer readable medium and, as such, is statutory subject matter. Claim 1 particularly recites the logical relationship among data elements (the point, and plurality of points defined by the first level and second level, respectively, of the signal constellation). Allowed claim 13 recites numerous, specific structural elements for performing data manipulation functions supported by a data constellation of the invention. There is no requirement that claim 1 recite such specific data manipulation functions. It is therefore clear that the recited signal constellation of claim 1 forms a data structure. As it is additionally recited that the signal constellation is stored “by a

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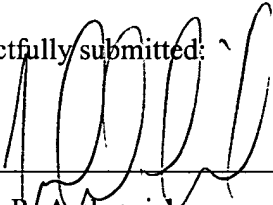
computer readable storage media”, it is therefore evident that claim 1 recites “structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure’s functionality to be realized, and is thus statutory”. As claim 1 is therefore directed to statutory subject matter, Applicants respectfully traverse the Examiner’s grounds for rejection. Claim 1 is therefore in condition for allowance. As claims 2-12 depend on claim 1, they are likewise in condition for allowance.

Allowable Subject Matter

The Examiner allowed claims 13-25.

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

Respectfully submitted: 

Jeffrey R. Ambroziak
Reg. No.: 47,387

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Date

Customer No.: 29683

S.N.: 10/699,386
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HARRINGTON & SMITH, LLP
4 Research Drive
Shelton, CT 06484-6212



Telephone: (203)925-9400
Facsimile: (203)944-0245
email: hsmith@hspatent.com

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5/5/2006 Elaine F. Muen
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